

DOCUMENT CONTROL LIST

DOCUMENT NO.	DOCUMENT CONTENT	REVISION
FABRICATION DOCUMENTS 80010 80020	Step Assembly Step End Fabrication	1 0
ENGINEERING DOCUMENTS ER800.02	Engineering Report	0

APPROVAL: <div style="border: 1px solid black; padding: 5px;"> <div style="display: inline-block; text-align: center;"> Transport Canada </div> <div style="display: inline-block; text-align: center;"> Transports Canada </div> </div> <div style="text-align: center; margin-top: 10px;"> AIRCRAFT CERTIFICATION DIVISION APPROVED By <u><i>[Signature]</i></u> App'l No. <u>SH00-48</u> App'l Date <u>00-12-08</u> Issue No. <u>7</u> Issue Date <u>09-04-07</u> <small>YY-MM-DD</small> </div>	<div> ORIGINAL DATE: 2 December, 2008 REVISION DATE: </div>	<div> AERO DESIGN LTD. 2013 - 39th Ave NE, Calgary, Alberta, T2E 6R7 Ph. (403) 250-8027 Fax. (403) 250-8333 www.aerodesign.ca </div>
SHEET 1 OF 1	Bell 206L Series & 407 Quick Release Step Fabrication	
<h2 style="margin: 0;">DCL800-12</h2>		Rev. <h2 style="margin: 0;">0</h2>

Jeff Clarke

From: Jeff Clarke [jeff@aerodesign.ca]
Sent: Tuesday, September 16, 2008 9:38 AM
To: 'Staal, Jack'
Subject: RE: SH07-56 Re-issue (C-08-0118)

Attachments: DCL800-11_0.pdf; DCL800-1_0.pdf; DCL704_3.pdf; DCL751-3_1.pdf; DCL751-1_1.pdf; FMS751.91_1.pdf; SH07-56_2_draft.doc



DCL800-11_0.pdf
(25 KB)



DCL800-1_0.pdf
(25 KB)



DCL704_3.pdf (23
KB)



DCL751-3_1.pdf
(23 KB)



DCL751-1_1.pdf
(23 KB)



FMS751.91_1.pdf
(102 KB)



SH07-56_2_draft.d
oc (938 KB)

Jack,

Please find attached the Document Control Lists that need to be signed off for the Step Installation, as well as the revised Flight Manual Supplement. Also included is a draft of the STC that has all of the configurations.

There are so many DCLs because when we originally approved the basket installation we did not separate the mounting provisions, and the options were not included.

All of the rest of the documents will be uploaded into NAPA shortly.

Let me know if you have any questions.

Regards,

Jeff Clarke, CET

AERO Design Ltd.
2013 39th Avenue NE
Calgary, Alberta
T2E 6R7

Phone: 403-250-8027
Fax: 403-250-8333

AERO Design Ltd.

**ENGINEERING REPORT
ER800.01**

QUICK RELEASE STEP INSTALLATION

Bell 205A-1, 212, 412 Series

Approved: E. Burgoin, P. Eng.

Prepared by: Jeff Clarke

Revision 0
Date: 18 July, 2007

AERO Design Ltd.
Engineering Consultants

2013 – 39th Avenue N.E., Calgary, Alberta T2E 6R7
Phone: (403) 250-8027
Fax: (403) 250-8333
E-Mail: info@aerodesign.ca

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1.0 INTRODUCTION

When the quick release cargo basket is removed from the helicopter, it is desirable to install a flight step to aid ingress and egress from the cabin without removing the basket provisions. This installation uses the existing mounting beams for the cargo baskets and uses the same locking mechanism to retain the step in place.

2.0 REFERENCE

AERO Design Ltd. Drawings 80001

MIL-HDBK-5J

3.0 BASIS OF CERTIFICATION

Bell 412CF, TCDS H-86 (Highest of Bell Medium):

FAR Part 29 dated 1 February 1965, Amendments 29-1 and 29-2, and FAR 29.473, 29.501, 29.771, 29.903(c), 29.1323, and 29.1505(b) of Amend. 29-3.

Plus FAR 29.663 of Amendment 29-3; FAR 29.1457 of Amend. 29-6; 29.939(c) of Amend. 29-12; 29.1335, 29.1351 of Amend. 29-14; 29.1353, 29.1581 of Amend. 29-15; 29.1545 of Amend. 29-17; 29.1321 of Amend 29-21; 29.151, 29.161, 29.672, 29.1303, 29.1309, 29.1325, 29.1329, 29.1331, 29.1333, 29.1355, 29.1357, 29.1555 of Amend. 29-24; 29.1459 of Amend 29-25; 29.1549 of Amend. 29-26; Appendix B to Part 29 of Amend. 29-31; 29.2 of Amend 29-32; FAR 29.1397 of Amend. 29-7; 29.1387 of Amend. 29-9; 29.1401, of Amend 29-11; 29.1322 of Amend 29-12; 29.1559 of Amend. 29-24; 29.501 of Amend 29-30; Appendix B to Part 29 of Amend. 29-31; 29.2 of Amend 29-32.

This installation:

Same as the basis of certification for each model as shown above.

4.0 ANALYSIS OF CURRENT AIRWORTHINESS DIRECTIVES (AD'S)

This installation does not impact on any current ADs.

5.0 LOADS

5.1 Inertia Loads

$$W_{\text{step}} = 8.2 \text{ lbs}$$

Weight of step

$$n_{\text{man_pos}} = 3.5$$

Limit positive maneuvering load factor (Ref: FAR 29.337)

$$n_{\text{sf}} = 1.5$$

Safety Factor (Ref: FAR 29.303)

$$n_{\text{ult_man_pos}} = n_{\text{man_pos}} \times n_{\text{sf}}$$

$$n_{\text{ult_man_pos}} = 3.5 \times 1.5 = 5.25$$

Ultimate positive maneuvering load factor

$$P_{\text{ult_man_pos}} = W_{\text{step}} \times n_{\text{ult_man_pos}}$$

$$P_{\text{ult_man_pos}} = 43 \text{ lbs}$$

Ultimate positive maneuvering load

The quick release step is not intended to be used in flight. As such, there is no requirement for the application of maneuvering inertia loads due to a person on the step. However, the step is checked for ultimate inertia load applied by two people to allow for the possibility of use during rappel or similar operations.

$$W_{\text{person}} = 170 \text{ lbs}$$

Weight of person

$$P_{\text{ult_man_pos}} = W_{\text{person}} \times 2 \times n_{\text{ult_man_pos}}$$

$$P_{\text{ult_man_pos}} = 1785 \text{ lbs}$$

Ultimate positive maneuvering load applied to step by 2 people

5.2 Aerodynamic Load

Drag

$$A_f := 10.2 \cdot \text{in}^2$$

Frontal Area of Step

$$V_{\text{ne}} := 155 \cdot \text{knots}$$

Never Exceed Speed of AS350/AS355/EC135
(Highest of all models)

$$V_d := \frac{V_{\text{ne}}}{0.9}$$

$$V_d = 172.2 \cdot \text{knots}$$

Design Dive Speed

$$\rho := 0.002378 \cdot \frac{\text{slug}}{\text{ft}^3}$$

Air Density at Sea Level

$C_{Do} := 2.0$ Coefficient of Drag (conservative)

$$P_{drag} := \frac{\rho}{2} \cdot V_d^2 \cdot A_f C_{Do}$$

$P_{drag} = 14.2 \cdot \text{lbf}$ Limit drag at V_d

$n_{sf} := 1.5$ Factor of Safety

$$P_{drag_ult} := P_{drag} \cdot n_{sf}$$

$P_{drag_ult} = 21.3 \cdot \text{lbf}$ Ultimate drag at V_d

Lift

$$A_{lift} := 3.4 \cdot \text{in} \cdot 73.75 \cdot \text{in}$$

$A_{lift} = 250.7 \cdot \text{in}^2$ Planar area of step (largest)

Coefficient of lift for round tubes relative to airflow varies from near 0 at 0° , to 0.4 at about 60° .

$C_L := 0.4$ Coefficient of lift (Max. for a round tube, $\sim 60^\circ$ to air flow)
(ref. Hoerner, Fig. 18)

$$P_{lift} := C_L \cdot \frac{\rho}{2} \cdot V_d^2 \cdot A_{lift}$$

$P_{lift} = 69.9 \cdot \text{lbf}$ Limit lift on step at V_d

$$P_{lift_ult} := P_{lift} \cdot n_{sf}$$

$P_{lift_ult} = 104.8 \cdot \text{lbf}$ Ultimate lift on step at V_d

6.0 STRUCTURAL COMPLIANCE

The aerodynamic drag load is very small and by inspection can be carried by the step assembly and its attachments.

The aerodynamic lift generated by the step is applied similar to the down load tested below, only upward. The downward test is sufficient to demonstrate the lift load.

A Quick Release Step Assembly was fabricated to fit a Bell Medium (71.00 inches centre to centre on the lugs). The down tubes with keyways (75132-01) were bolted to lugs welded to a large I beam, using the bottom hole to simulate the actual attachment.

The step was loaded with 1800 lbs of lead shot (72 bags @ 25 lbs), evenly distributed over the surface of the step. It was checked for deflection before, during, and after the test.



Figure 1 – Ultimate Maneuvering Load on Step Assembly

At ultimate load there was almost 2 inches of deflection. With the load removed there was no permanent deformation found.

The down tubes, aluminum beams and helicopter attachments have been demonstrated to be acceptable for 300 lbs in a cargo basket weighing 50 lbs (350 lbs total). Refer to ER751.01 and TR751.02. The installation is acceptable for installation on Bell Medium helicopters.

7.0 COMPLIANCE WITH 29.251 AND 29.629

The frontal and planar area of the step is significantly smaller than the area of the cargo basket which uses the same mounting provisions. The step section is a closed section so it is torsionally rigid and will not allow flexing between the attachments. The conclusion that can be drawn from these properties is that the aerodynamic loading or turbulence shedding from the step will be significantly less than from the basket, and are expected to be similar to the basic unmodified helicopter.

The effects of vibration (29.251) and flutter (29.629) have been considered over the flight regime of the helicopter, and there is no effect expected.

Jeff Clarke

From: Staal, Jack [STAALJ@tc.gc.ca]
Sent: Monday, September 15, 2008 10:18 AM
To: jeff@aerodesign.ca
Subject: RE: SH07-56 Re-issue (C-08-0118)

Jeff,

Given that the step will replace the basket (my understanding) and the step is much smaller and lighter than the basket I am quite comfortable with performance/handling issues not needing further flight test. Do you concur?

As regards vibration my understanding, per the CP, was that the delegate was going to evaluate this in the report. Special delegation was requested.

Regards,
Jack

-----Original Message-----

From: Jeff Clarke [mailto:jeff@aerodesign.ca]
Sent: Monday, September 15, 2008 9:56 AM
To: Staal, Jack
Subject: RE: SH07-56 Re-issue (C-08-0118)

Jack,

Below is the email Ted originally sent to Greg. I have attached the installation drawings. We are only looking at the Bell Medium at this point.

Really what we were looking for was acceptance that we do not need to flight test the step before submitting everything, but we can discuss that this morning.

Jeff

-----Original Message-----

From: Ted [mailto:ted@aerodesign.ca]
Sent: Monday, July 21, 2008 11:48 AM
To: Oucharek, Gregory
Subject: Addition of Step to Cargo Basket Installations

Good morning Greg

Further to our conversation on Friday in the parking lot, I've got Jeff proceeding with the step installation for the Bell 212, Bell 206L/407 and AS350 Installations.

As we discussed, I'm amending the Cargo Basket Instn STC's to include the step as an alternate configuration.

Attached are the instn drwgs for the 212 provisions, 212 basket installation and 212 step.

At this point I've included a section in the report that provides a statement for compliance with the vibration (29.251) requirement. I don't see any point in doing a flight test given that the basket has been flown by Michel in the past and the step is very stiff.

Confirm that you are ok with this approach.

Ted.

-----Original Message-----

From: Staal, Jack [mailto:STAALJ@tc.gc.ca]
Sent: Monday, September 15, 2008 9:01 AM
To: Ted Burgoin (E-mail)
Cc: Jeff Clarke (E-mail)
Subject: SH07-56 Re-issue (C-08-0118)

Hi Ted/Jeff,

Further to Ted's call on Friday I have a file open C-08-0118.

There are two applications on file. One from February 2008 one from July 2008.

The February application is superseded by the July application as I understand it.

The July application (for Step Installation) has a Compliance Program CP800-1 requesting special delegation for 29.251 and 29.629. We are drafting the delegation letter and hope to have it out to you today (this morning I hope).

I have no additional information on file (paper) and NAPA seems only to have data that was copied from SH07-056 Issue 1 (C-07-1032) when C-08-0118 was raised, when I checked on Friday.

Will await data upload or mail copies before being able to proceed further.

Thought I better email will follow with a telecon later.

Regards,

J.H. (Jack) Staal
Aircraft Certification Technologist | Technologue, Certification des aeronefs.
Prairie and Northern Region | Region des Prairies et du Nord

Telephone | telephone: (780)495-5227
Facsimilie | telecopier: (780)495-7963
Email | courriel: staalj@tc.gc.ca
TTY / ATS : 1-888-675-6863

Transport Canada | Transports Canada
1100- 9700, Jasper Avenue | avenue Jasper (RAED) Edmonton, AB T5J 4E6 Government of
Canada | Gouvernement du Canada To provide feedback to TCCA, use CAIRS. See:
<<http://www.tc.gc.ca/CivilAviation/ManagementServices/QA/cairs.htm>>



Transport
Canada

Transports
Canada

1100 Jasper Avenue
Edmonton, Alberta T5J 4E6

Your file Votre référence

September 15, 2008

Our file Notre référence

C-08-0118

5010-0402

Aero Design Limited
2013 39th Ave NE
Calgary, AB T2E 6R7

Attention: Ted Burgoin – DAR 290M

Dear Mr. Burgoin:

SUBJECT: Extension of Delegation – Quick Release Step – Bell 205A-1, 205B, 212, 412, 412CF, 412EP

REFERENCE: NAPA Project Number C-08-0118
Approval Number: SH07-56 – Issue 2

This is in response to your request for extension of delegation.

Your delegation of authority as a DAR is hereby extended to make findings of compliance to the following paragraphs as referenced in Compliance Program CP800-1:

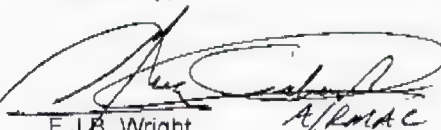
29.251 Vibration
29.629 Flutter

This extension of delegation is limited to this project and approval number only and may not be further extended without an additional request.

Once approval is issued, please submit data in accordance with procedures established in your EPM.

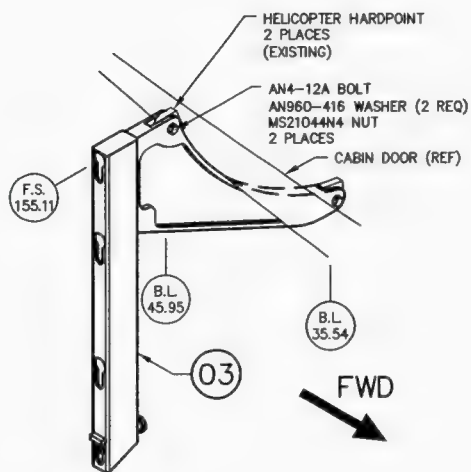
If you have any questions, please contact Jack Staal at 780-495-5227

Yours truly,

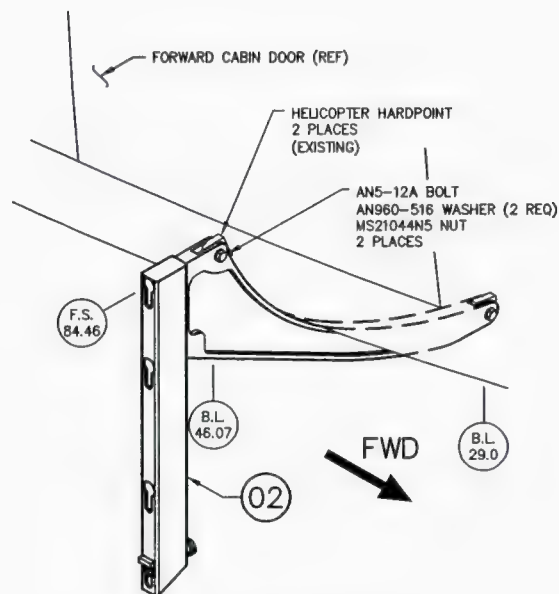
FOR: 
F.J.B. Wright
Regional Manager
Aircraft Certification Division
Prairie and Northern Region
Edmonton
Phone: (780) 495-3856
Fax: (780) 495-7963

Canada

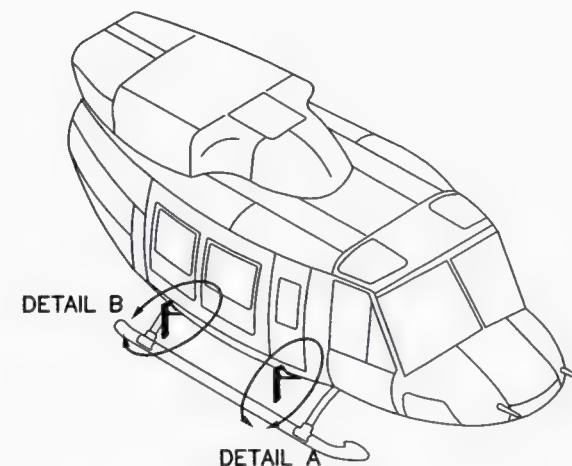
REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE	BJC	JULY 11/08



DETAIL B
NOT TO SCALE
LOOKING AT AFT BEAM



DETAIL A
NOT TO SCALE
LOOKING AT FORWARD BEAM



01 PROVISIONS INSTALLATION

RIGHT SIDE INSTALLATION SHOWN, LEFT SIDE INSTALLATION OPPOSITE
BELL 212 SHOWN, BELL 205A-1 AND 412 INSTALLATION IDENTICAL
NOT TO SCALE

2	MS21044N4		NUT
2	MS21044N5		NUT
4	AN960-416		WASHER
4	AN960-516		WASHER
2	AN4-12A		BOLT
2	AN5-12A		BOLT
1	75116-01	03	AFT BEAM ASSEMBLY
1	75115-01	02	FORWARD BEAM ASSEMBLY
	75102-01	01	PROVISIONS INSTALLATION
01	PART NO.	ITEM	DESCRIPTION
QTY	LIST OF MATERIALS		

APPROVALS	DATE
DRAWN: JEFF CLARKE	11 JULY 2008
CHECKED: E. BURGOIN	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS ANGLES X.XXX ±0.010 ±1/2° X.XX ±0.03 X.X ±0.1	

AERO DESIGN LTD. CONSULTING ENGINEERS, TRANSPORT CANADA APPROVALS, DAR 290M 2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7 tel: (403) 250-8027 fax: (403) 250-8333 www.aerodesign.ca			
BELL 205A-1, 212, 412 SERIES QUICK RELEASE MOUNTING PROVISIONS INSTALLATION			
NOT TO SCALE	DWG. SIZE	DWG. NO.	REV.
SHEET 1 OF 2	A4	75102	0

REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE	BJC	JULY 11/08

NOTES

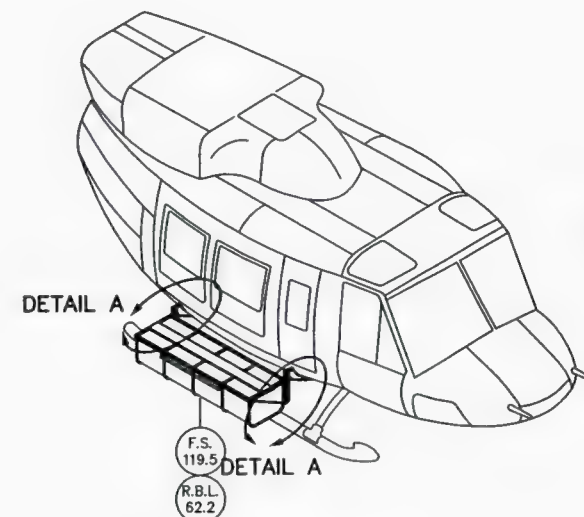
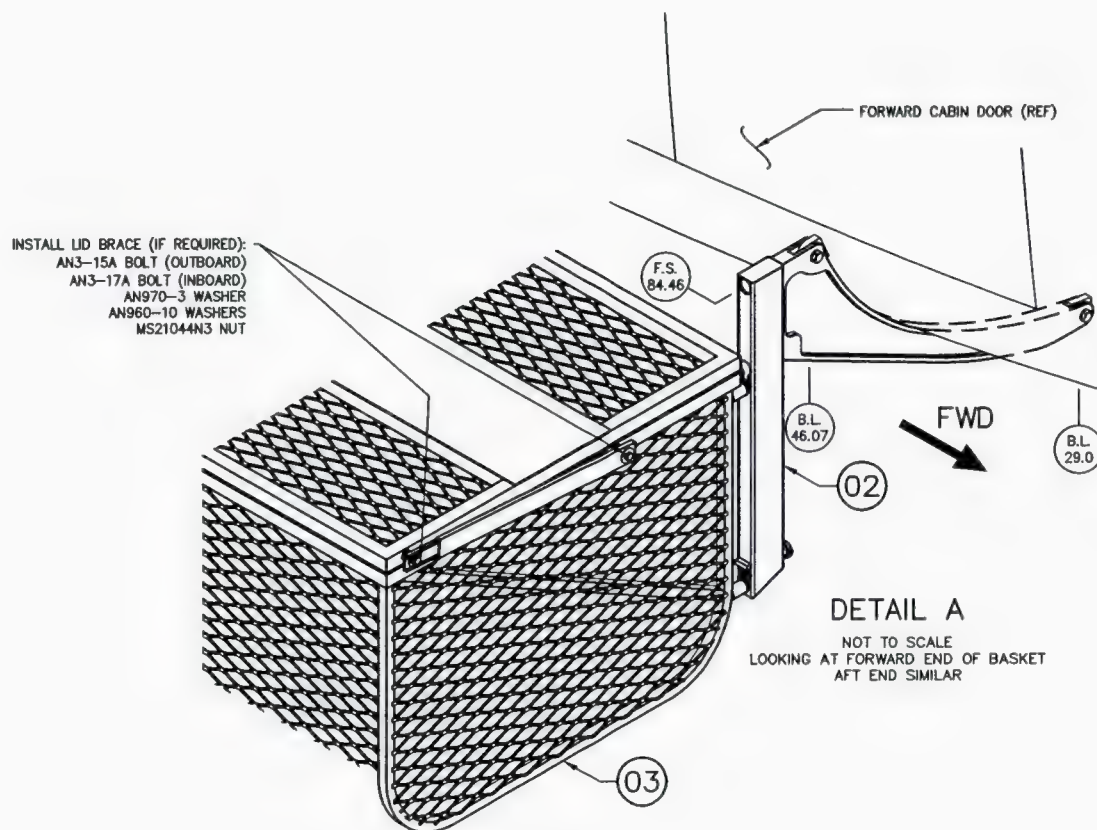
1. HIGH SKID GEAR INSTALLATION IS A MANDATORY PREREQUISITE FOR THIS INSTALLATION.
2. THE HELICOPTER HARD POINTS ORIGINALLY HAVE BUSHINGS INSTALLED. HARD POINTS MUST HAVE THESE BUSHINGS INSTALLED AND PRESSED FLUSH PRIOR TO INSTALLATION OF THE QUICK RELEASE CARGO BASKET PROVISIONS.
3. QUICK RELEASE MOUNTING PROVISIONS (ITEM 02) MAY BE INSTALLED ON THE RIGHT AND/OR LEFT SIDE OF THE HELICOPTER. LATERAL ARMS IN THE WEIGHT AND BALANCE ARE FOR RIGHT SIDE INSTALLATION. LATERAL ARMS ARE NEGATIVE FOR LEFT SIDE INSTALLATION.

WEIGHT AND BALANCE

ITEM	DESCRIPTION	WEIGHT (LB)	LONGITUDINAL		LATERAL	
			ARM (IN)	MOMENT (LB-IN)	ARM (IN)	MOMENT (LB-IN)
02	FORWARD BEAM ASSEMBLY	5.0	84.5	422.5	46.0	230.0
03	AFT BEAM ASSEMBLY	4.6	155.1	713.5	47.3	217.6
01	PROVISIONS INSTALLATION (TOTAL)	9.6	118.3	1136.0	46.6	447.6

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	DRAWN: JEFF CLARKE		11 JULY 2008									
	CHECKED: E. BURGOIN				BELL 205A-1, 212, 412 SERIES QUICK RELEASE MOUNTING PROVISIONS INSTALLATION							
	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS ANGLES X.XXX ±0.010 ±1/2" X.XX ±0.03 X.X ±0.1								NOT TO SCALE	DWG. SIZE	DWG. NO.	REV.
									SHEET 2 OF 2	A4	75102	0

REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE	BJC	SEPT 05/07
1	DRAWING RESIZED, PROVISIONS MOVED TO DRAWING 75102	BJC	JULY 11/08



01 INSTALLATION

RIGHT SIDE INSTALLATION SHOWN, LEFT SIDE INSTALLATION OPPOSITE
BELL 212 SHOWN, BELL 205A-1 AND 412 INSTALLATION IDENTICAL
NOT TO SCALE

1	75110-01	03	BASKET ASSEMBLY
1	75102-01	02	PROVISIONS INSTALLATION
	75101-01	01	INSTALLATION
QTY	PART NO.	ITEM	DESCRIPTION
			LIST OF MATERIALS

APPROVALS	DATE
DRAWN: JEFF CLARKE	05 SEPT 2007
CHECKED: E. BURGAIN	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
TOLERANCES ON:
DECIMALS ANGLES
X.XXX ± 0.010 $\pm 1/2^\circ$
X.XX ± 0.03
X.X ± 0.1

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2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7
tel: (403) 250-8027 fax: (403) 250-8333 www.aerodesign.ca

BELL 205A-1, 212, 412 SERIES QUICK RELEASE CARGO BASKET INSTALLATION

NOT TO SCALE	DWG. SIZE	DWG. NO.	REV.	
SHEET 1 OF 2	A4	75101	1	

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REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE	BJC	SEPT 05/07
1	DRAWING RESIZED, PROVISIONS MOVED TO DRAWING 75102	BJC	JULY 11/08

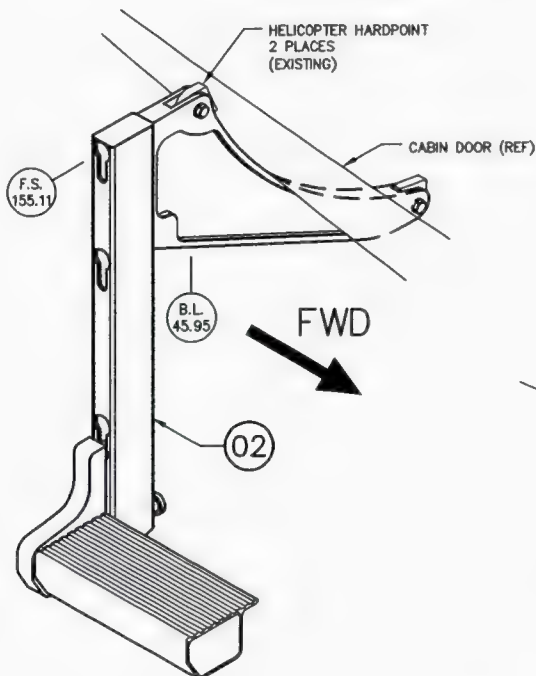
NOTES

- HIGH SKID GEAR INSTALLATION IS A MANDATORY PREREQUISITE FOR THIS INSTALLATION.
- QUICK RELEASE MOUNTING PROVISIONS INSTALLED IN ACCORDANCE WITH DRAWING 75102 IS A MANDATORY PREREQUISITE FOR THIS INSTALLATION.
- REFER TO FLIGHT MANUAL SUPPLEMENT, FMS751.91, FOR LIMITATIONS WITH THE QUICK RELEASE CARGO BASKET INSTALLED.
- REFER TO INSTRUCTIONS FOR CONTINUED AIRWORTHINESS, ICA751.90, FOR MAINTENANCE INFORMATION.
- REFER TO DRAWING 36255 FOR HANDLE INSTALLATION IF REQUIRED.
- CARGO BASKET PROVISIONS (ITEM 02) MAY BE INSTALLED ON THE RIGHT AND/OR LEFT SIDE OF THE HELICOPTER.
CARGO BASKET (ITEM 03) MAY BE INSTALLED ON THE RIGHT OR LEFT SIDE.
LATERAL ARMS IN THE WEIGHT AND BALANCE ARE FOR RIGHT SIDE INSTALLATION. LEFT SIDE INSTALLATION ARMS ARE NEGATIVE.

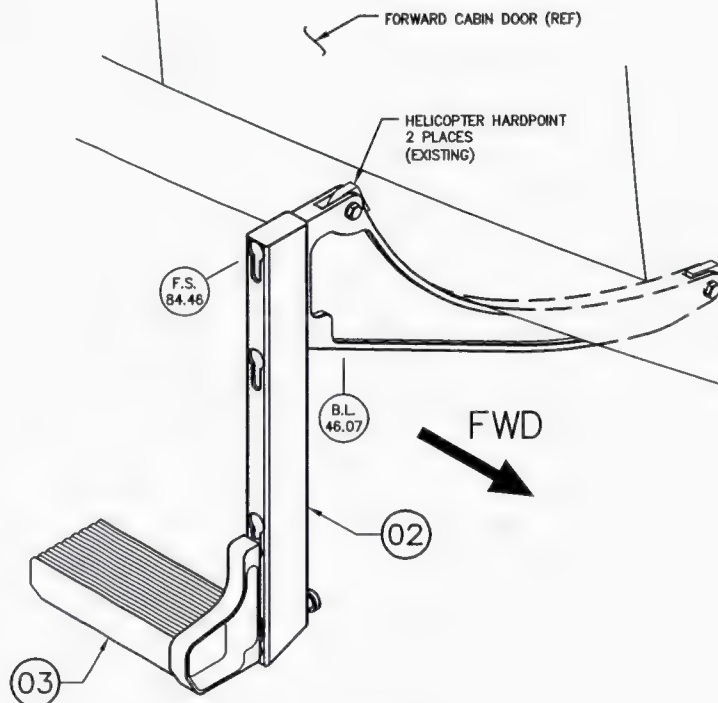
WEIGHT AND BALANCE						
ITEM	DESCRIPTION	WEIGHT (LB)	LONGITUDINAL		LATERAL	
			ARM (IN)	MOMENT (LB-IN)	ARM (IN)	MOMENT (LB-IN)
02	PROVISIONS INSTALLATION	9.6	118.3	1136.0	46.6	447.6
03	CARGO BASKET	49.5	119.5	5915.3	62.2	3078.9
01	INSTALLATION (TOTAL)	59.1	119.3	7051.3	59.7	352
	CARGO (POSITIONS GIVEN ARE FOR CENTRE OF BASKET)	300 MAX	119.5	35850	62.2	18660

APPROVALS		DATE		AERO DESIGN LTD. CONSULTING ENGINEERS, TRANSPORT CANADA APPROVALS, DAR 290M 2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7 tel: (403) 250-8027 fax: (403) 250-8333 www.aerodesign.ca				
DRAWN: JEFF CLARKE		05 SEPT 2007						
CHECKED: E. BURGOIN								
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS ANGLES X.XXX ±0.010 ±1/2° X.XX ±0.03 X.X ±0.1				BELL 205A-1, 212, 412 SERIES QUICK RELEASE CARGO BASKET INSTALLATION				
				NOT TO SCALE	DWG. SIZE	DWG. NO.	REV.	
				SHEET 2 OF 2	A4	75101	1	

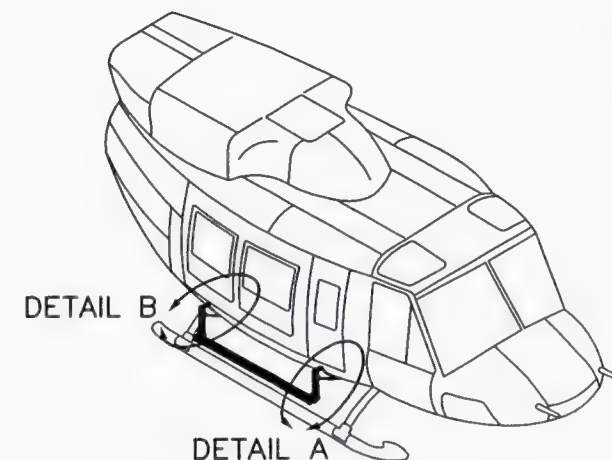
REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE	BJC	JULY 15/08



DETAIL B
NOT TO SCALE
LOOKING AT AFT END



DETAIL A
NOT TO SCALE
LOOKING AT FORWARD END



(01) STEP INSTALLATION

RIGHT SIDE INSTALLATION SHOWN, LEFT SIDE INSTALLATION OPPOSITE
BELL 212 SHOWN, BELL 205A-1 AND 412 INSTALLATION IDENTICAL
NOT TO SCALE

1	80010-7100	03	STEP ASSEMBLY (71.00 LONG)
1	75102-01	02	PROVISIONS INSTALLATION
1	80001-01	01	STEP INSTALLATION
QTY	PART NO.	ITEM	DESCRIPTION
LIST OF MATERIALS			

APPROVALS	DATE
DRAWN: JEFF CLARKE	15 JULY 2008
CHECKED: E. BURGOIN	

AERO DESIGN LTD.
CONSULTING ENGINEERS, TRANSPORT CANADA APPROVALS, DAR 290M
2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7
tel: (403) 250-8027 fax: (403) 250-8333 www.aerodesign.ca

--- NOTICE ---
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DIMENSIONS ARE IN INCHES.
TOLERANCES ON:
DECIMALS ANGLES
X.XXX ±0.010 ±1/2°
X.XX ±0.03
X.X ±0.1

**BELL 205A-1, 212, 412 SERIES
QUICK RELEASE STEP INSTALLATION
STEP INSTALLATION**

NOT TO SCALE	DWG. SIZE	DWG. NO.	REV.
SHEET 1 OF 2	A4	80001	0

REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE	BJC	JULY 15/08

NOTES

1. HIGH SKID GEAR INSTALLATION IS A MANDATORY PREREQUISITE FOR THIS INSTALLATION.
2. QUICK RELEASE MOUNTING PROVISIONS (ITEM 02) INSTALLED IN ACCORDANCE WITH DRAWING 75102 ARE A MANDATORY PREREQUISITE FOR THIS INSTALLATION.
3. QUICK RELEASE STEP MAY BE INSTALLED ON THE RIGHT AND/OR LEFT SIDE OF THE HELICOPTER.
WEIGHT AND BALANCE IS GIVEN FOR RIGHT SIDE, LATERAL ARMS ARE NEGATIVE FOR LEFT SIDE INSTALLATION.
4. REFER TO FLIGHT MANUAL SUPPLEMENT, FMS800.91, FOR LIMITATIONS WITH THE QUICK RELEASE STEP INSTALLED.
5. REFER TO INSTRUCTIONS FOR CONTINUED AIRWORTHINESS, ICA800.90, FOR MAINTENANCE INFORMATION.

WEIGHT AND BALANCE

ITEM	DESCRIPTION	WEIGHT (LB)	LONGITUDINAL		LATERAL	
			ARM (IN)	MOMENT (LB-IN)	ARM (IN)	MOMENT (LB-IN)
02	PROVISIONS INSTALLATION	9.6	118.3	1136.0	46.6	44
03	STEP ASSEMBLY	7.8	119.8	934.4	52.2	407.1
01	STEP INSTALLATION (TOTAL)	17.4	119.0	2070.4	49.1	854.7

APPROVALS		DATE		AERO DESIGN LTD. CONSULTING ENGINEERS, TRANSPORT CANADA APPROVALS, DAR 290M 2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7 tel: (403) 250-8027 fax: (403) 250-8333 www.aerodesign.ca					
DRAWN: JEFF CLARKE		15 JULY 2008							
CHECKED: E. BURGOIN									
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS ANGLES X.XXX ±0.010 ±1/2° X.XX ±0.03 X.X ±0.1				BELL 205A-1, 212, 412 SERIES QUICK RELEASE STEP INSTALLATION STEP INSTALLATION					
				NOT TO SCALE		DWG. SIZE	DWG. NO.	REV.	
				SHEET 2 OF 2		A4	80001	0	

Department of Transport

Supplemental Type Certificate

This approval is issued to:

AERO Design Ltd.
2013 39th Avenue NE
Calgary, Alberta
Canada T2E 6R7

Number: SH07-56

Issue No.: 2

Approval Date: 24 December, 2007

Issue Date: September, 2008

Responsible Office:

Prairie and Northern

Aircraft/Engine Type or Model:

BELL 205A-1, 205B, 212, 412, 412EP, 412CF

Registration/Serial No.:

All eligible

Canadian Type Certificate or Equivalent:

H1SW (205A-1), H-104 (205B), H-86 (212, 412 Series)

Description of Type Design Change:

Installation of Quick Release Mounting Provisions / Cargo Basket / Step on the right or left side of the helicopter.

**Installation/Operating Data,
Required Equipment and Limitations:**

Configuration A – Quick Release Mounting Provisions:

Installation of Quick Release Mounting Provisions to be completed in accordance with Transport Canada Civil Aviation (TCCA) approved, AERO Design Ltd. Document Control List, DCL751-1, Revision 1, dated 15 September 2008, or later approved revision.

Quick Release Mounting Provisions may remain installed if any other configuration is removed.

Configuration B – Quick Release Cargo Basket Installation:

Installation of Configuration A – Quick Release Mounting Provisions is a mandatory prerequisite for installation of Configuration B. Installation of Quick Release Cargo Basket to be completed in accordance with TCCA approved, AERO Design Ltd. Document Control List, DCL751-1, Revision 1, dated 15 September 2008, or later approved revision.

Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated **will not** adversely affect the airworthiness of the modified product.

For Minister of Transport

NOTE: THIS ADDENDUM SHALL REMAIN PART OF THE CERTIFICATE REFERRED TO THEREIN.

Configuration C - Quick Release Step Installation:

Installation of Configuration A - Quick Release Mounting Provisions is a mandatory prerequisite for installation of Configuration C. Installation of Quick Release Step to be completed in accordance with TCCA approved, AERO Design Ltd. Document Control List, DCL800-1, Revision 0, dated 15 September 2008, or later approved revision.

TCCA accepted, AERO Design Ltd. Instructions for Continued Airworthiness ICA800.90, Revision 0, dated 17 July, 2008, or later accepted revision is required with installation of the quick release step.

Cargo Basket Modifications:

Modifications to the cargo basket configuration are eligible in accordance with TCCA approved, AERO Design Ltd. Document Control List DCL704, Revision 3, dated 31 July, 2008, or later approved revision. Eligibility limitations are noted on the drawings.

Data Pertinent to All Configurations:

TCCA approved, AERO Design Ltd. Flight Manual Supplement FMS751.91, Revision 1, dated 16 July, 2008, or later approved revision is required with this installation.

TCCA accepted, AERO Design Ltd. Instructions for Continued Airworthiness ICA751.90, Revision 0, dated 06 September, 2007, or later accepted revision is required with this installation.

Certification Basis: FAR 29 at amendment 29-2, plus select sections of later amendments. (Bell 412 CF basis of certification)

— End —

BELL 205A-1 / 212 / 412

ROTORCRAFT FLIGHT MANUAL SUPPLEMENT for the **INSTALLATION of the AERO DESIGN** **QUICK RELEASE CARGO BASKET** **AND/OR QUICK RELEASE STEP**

Supplemental Type Certificate No. SH07-56

Sections I, II, III and IV of this document comprise the Transport Canada Approved sections of this Flight Manual Supplement. Compliance with Section I, Limitations, is mandatory.

Section V and any subsequent sections if present are Unapproved and are provided for information only.

The information and data contained in this Flight Manual Supplement supersede or supplement that contained in the basic Approved Flight Manual for the Bell 205A-1 / 212 / 412 when fitted with the Quick Release Cargo Basket or Step Installation. For limitations, procedures and performance not listed in this Flight Manual Supplement, refer to the Approved Flight Manual and other approved Flight Manual Supplements.

Table of Contents

I	Limitations	3
II	Normal Procedures	3
III	Emergency Procedures	3
IV	Performance	3
V	Weight and Balance	4
VI	Installation / removal instructions	6

Record of Revisions

Revision	Issue Date	Pages Revised	Date Inserted	By
0	07 Sept, 2007	None		
1	16 July, 2008	All		

I LIMITATIONS

1. The maximum load in the AERO Design Ltd. Quick Release Cargo Basket is 300 lb. (135.7 kg).
2. Only one basket may be installed on the helicopter, on the right or left side.
3. Flight operations limited to VFR conditions with AERO Design Ltd. Quick Release Cargo Basket installed.
4. V_{NE} is unchanged from the basic rotorcraft.
5. Quick Release Step may be installed on the right and/or left side when the basket is removed. Installation on both sides is approved.

II NORMAL PROCEDURES

1. Pre-flight inspections:
 - a) Ensure that all cargo stored in the cargo basket is properly tied down and secured for flight.
 - b) Ensure that the lid of cargo basket is closed and secured.
 - c) Ensure the basket is locked in position on the beams. Pull up on the forward and aft end of the basket to check.
 - d) Ensure the step is locked in position on the beams. Pull up on the forward and aft end of the step to check.

CAUTION

It is possible to exceed the lateral centre of gravity limits of the rotorcraft under some loading conditions. Pilots must ensure that lateral C of G is within limits when loading the basket.

III EMERGENCY PROCEDURES

No change from basic Approved Flight Manual.

IV PERFORMANCE

1. Cruise performance and range will be reduced by approximately 10 percent with the Cargo Basket installed.
2. Climb performance will be reduced by up to 150 fpm with the Cargo Basket installed.

V WEIGHT AND BALANCE

- The following weight and balance is for the low mounted quick release cargo basket configuration, installed in accordance with drawing 75101.

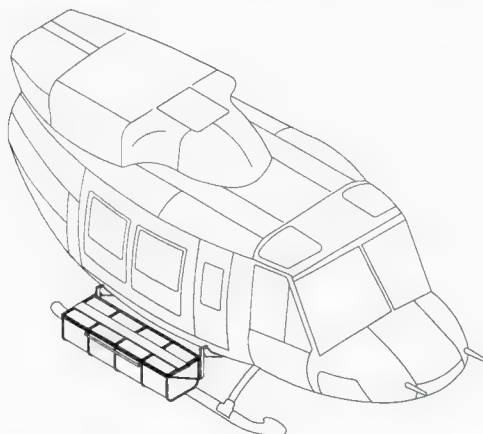


Figure 1 – Quick Release Cargo Basket Configuration

Quick Release Cargo Basket Configuration

Item	Weight	Longitudinal		Lateral	
		Arm	Moment	Arm	Moment
Basket Only ¹	49.5 lb	119.5 in	5 915 in*lb	+/- 62.2 in	+/- 3 079 in*lb
	22.4 kg	3035 mm	67 979 mm*kg	+/- 1580 mm	+/- 35 389 mm*kg
Cargo ² (MAX)	300 lb	119.5 in	35 850 in*lb	+/- 62.2 in	+/- 18 660 in*lb
	135.7 kg	3035 mm	411 991 mm*kg	+/- 1580 mm	+/- 214 480 mm*kg

¹ Weight and balance is for Cargo Basket only. Mounting beams are not included since they should have been included in the basic rotorcraft weight and balance at time of initial installation.

² Longitudinal and Lateral moment arms are given only for the center of the Cargo Basket. Due to the length of the basket, some loading arrangements may require that actual moment arms be measured, to determine the correct moments about the center of gravity.

CAUTION:

It is possible to exceed lateral CG limits in some configurations.

2. The following weight and balance is for the quick release step configuration, installed in accordance with drawing 80001.

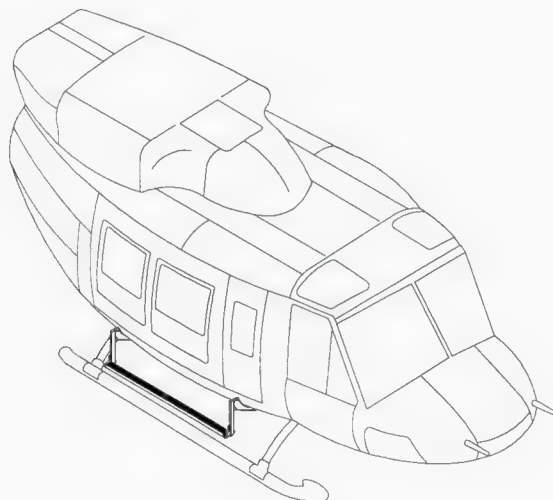


Figure 2 – Quick Release Step Configuration

Quick Release Step Configuration

Item	Weight	Longitudinal		Lateral	
		Arm	Moment	Arm	Moment
Step Only ¹	7.8 lb	119.8 in	934 in*lb	+/- 52.2 in	+/- 407 in*lb
	3.5 kg	3043 mm	10 650 mm*kg	+/- 1326 mm	+/- 4 641 mm*kg

¹ Weight and balance is for Step only. Mounting beams are not included since they should have been included in the basic rotorcraft weight and balance at time of initial installation.

VI INSTALLATION / REMOVAL INSTRUCTIONS

The Quick Release Mounting Beams are installed in accordance with drawing 75102. The Quick Release Basket is installed in accordance with drawing 75101. The Quick Release Step is installed in accordance with drawing 80001. Removal of the basket or step leaving the beams in place is an approved configuration for flight. Logbook entry indicating installation or removal of basket or step and which weight and balance amendment is in effect is required.

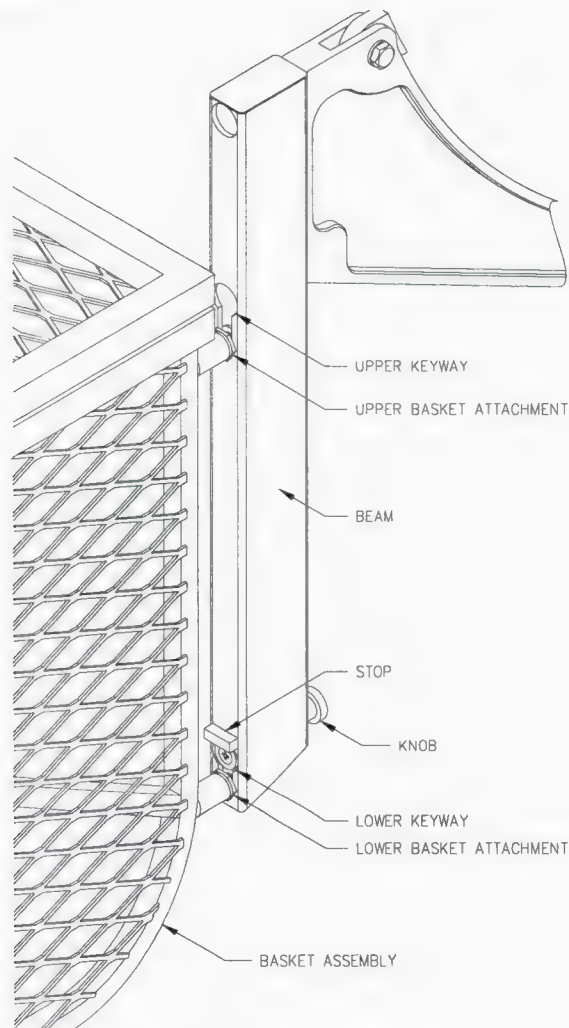


Figure 3 – Basket Attachment

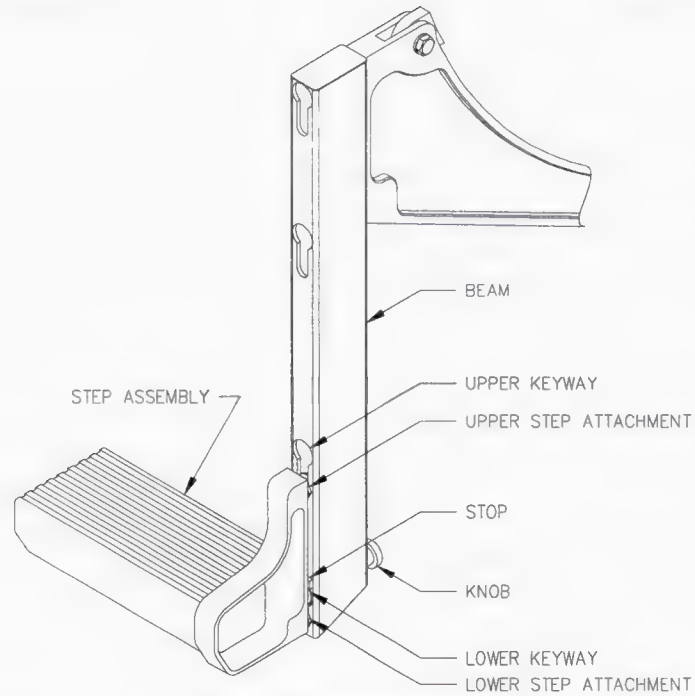


Figure 4 – Step Attachment

Installation and removal instructions are the same for the Quick Release Basket and Quick Release Step Assembly.

1. Installation - Refer to Figure 3/4.
 1. Set upper attachment into upper keyway on forward and aft beams.
 2. At forward end, lift basket or step until lower attachment fitting hits stop over keyway. Push fitting into keyway and slide down until locked. Repeat for aft end.
2. Removal - Refer to Figure 3/4.
 1. Pull knob at bottom end of forward beam and lift basket or step until lower attachment fitting is free of keyway. Keep upper attachment in keyway in beam. Repeat for aft end.
 2. Lift basket or step until upper attachments are out of keyways in beams and remove from helicopter.

DOCUMENT CONTROL LIST

DOCUMENT NO.	DOCUMENT CONTENT	REVISION
FABRICATION DOCUMENTS		
70401	Open Forward End Modification (Bell 206L/407 Fixed Basket only)	0
70402	Lid Door Modification	1
70403	Auxiliary Latch Modification	2
70404	Open Forward End Modification (Quick Release Basket)	1
70405	Lid Step Modification	1
70406	Open Forward End Modification (Eurocopter AS350/AS355 Quick Release Only)	0
70407	Open Forward End Modification (Eurocopter EC135 Quick Release Only)	0
ENGINEERING DOCUMENTS		
ER704.02	Engineering Report	0
APPROVAL:	ORIGINAL DATE: 10 May 2006	AERO DESIGN LTD. 2013 – 39 th Ave NE, Calgary, Alberta, T2E 6R7 Ph. (403) 250-8027 Fax. (403) 250-8333
	REVISION DATE: 31 July, 2008	
	SHEET 1 OF 1	Cargo Basket Modifications
	DCL704	Rev. 3

FORM AE-100

DEPARTMENT OF TRANSPORT STATEMENT OF COMPLIANCE OF AIRCRAFT OR AIRCRAFT COMPONENTS WITH THE AIRWORTHINESS REQUIREMENTS		AE-100 No.: AE704 Initial Issue Date: 25 May, 2006 Revision: 3 Revision Date: 15 September, 2008 Approval No.: SH07-56 Delegation No.: 290M Delegate Name: E. Burgoin Classification of Designee: Employer: AERO Design Ltd.	
Aircraft Mfr: Bell Aircraft Model: 205/212/412 Registration: All Eligible		Model Type Airplane <input type="checkbox"/> Helicopter <input checked="" type="checkbox"/> Appliance <input type="checkbox"/> Component <input type="checkbox"/>	
LIST OF APPROVED REPORTS AND DATA			
Document Number	Revision	Document Title	Compliance Status
DCL704	Revision 3	Document Control List and all documents referred to therein	
70402	Revision 1	Lid Door Modification	
70403	Revision 2	Auxiliary Latch Modification	
70404	Revision 1	Open Front Modification	
70405	Revision 1	Lid Step Modification	
		DATA APPROVED BY TRANSPORT CANADA	
CERTIFICATION			
<p>UNDER THE AUTHORITY VESTED IN ME BY THE DEPARTMENT OF TRANSPORT, I HEREBY CERTIFY THAT THE DATA LISTED ABOVE AND ON THE ATTACHED SHEETS NUMBERED Nil HAVE BEEN EXAMINED IN ACCORDANCE WITH ESTABLISHED PROCEDURES AND FOUND TO COMPLY, TO THE BEST OF MY KNOWLEDGE AND BELIEF WITH THE PERTINENT COMPLIANCE REQUIRMENTS.</p> <p>I THEREFORE <input type="checkbox"/> RECOMMEND FOR APPROVAL OF THESE DATA</p> <p><input checked="" type="checkbox"/> APPROVE THESE DATA</p> <div style="text-align: right; margin-top: 20px;">  E. Burgoin, DAR 290M </div>			

DOCUMENT CONTROL LIST

DOCUMENT NO.	DOCUMENT CONTENT	REVISION
FABRICATION DOCUMENTS		
75115	Forward Beam Assembly	0
75116	Aft Beam Assembly	0
75130	Forward Beam	0
75131	Aft Beam	0
75132	Tube Assembly	1
ENGINEERING DOCUMENTS		
ER751.01	Engineering Report	0
TR751.02	Test Report	0
APPROVAL:	ORIGINAL DATE: 6 September, 2007	AERO DESIGN LTD. 2013 – 39 th Ave NE, Calgary, Alberta, T2E 6R7 Ph. (403) 250-8027 Fax. (403) 250-8333
	REVISION DATE: 15 September, 2008	
	SHEET 1 OF 1	Bell 205A-1 / 212 / 412 Quick Release Mounting Beams
	DCL751-3	Rev. 1

DOCUMENT CONTROL LIST

DOCUMENT NO.	DOCUMENT CONTENT	REVISION
INSTALLATION DOCUMENTS		
75101	Quick Release Cargo Basket Installation	1
75102	Quick Release Provisions Installation	0
ICA751.90	Instructions for Continued Airworthiness	0
FMS751.91	Flight Manual Supplement	1
FABRICATION DOCUMENTS		
DCL751-2	Document Control List for Quick Release Cargo Basket	0
DCL751-3	Document Control List for Beams	1
ENGINEERING DOCUMENTS		
APPROVAL:	ORIGINAL DATE: 6 September, 2007 REVISION DATE: 15 September, 2008	AERO DESIGN LTD. 2013 – 39 th Ave NE, Calgary, Alberta, T2E 6R7 Ph. (403) 250-8027 Fax. (403) 250-8333
	SHEET 1 OF 1	Bell 205A-1 / 212 / 412 Quick Release Cargo Basket Installation
	DCL751-1	Rev. 1

FORM AE-100

DEPARTMENT OF TRANSPORT STATEMENT OF COMPLIANCE OF AIRCRAFT OR AIRCRAFT COMPONENTS WITH THE AIRWORTHINESS REQUIREMENTS		AE-100 No.: AE751-1 Initial Issue Date: 24 December, 2007 Revision: 1 Revision Date: 15 September, 2008	
Aircraft Mfr: Bell Aircraft Model: 205A-1/212/412 Series Registration: ALL ELIGIBLE		Model / Type Airplane <input type="checkbox"/> Helicopter <input checked="" type="checkbox"/> Appliance <input type="checkbox"/> Component <input type="checkbox"/>	Approval No.: SH07-56 Delegation No.: 290M Delegate Name: E. Burgoin Company: AERO Design Ltd.
LIST OF APPROVED REPORTS AND DATA			
Document Number	Revision	Document Title	Compliance Status
DCL751-1 75101 75102	1 1 0	Document Control List and all documents referred to therein Quick Release Cargo Basket Installation Quick Release Mounting Provisions Installation	As per Compliance Program, CP751, Revision 1
DATA APPROVED BY TRANSPORT CANADA			
FMS751.91	1	Flight Manual Supplement	
CERTIFICATION UNDER THE AUTHORITY VESTED IN ME BY THE DEPARTMENT OF TRANSPORT, I HEREBY CERTIFY THAT THE DATA LISTED ABOVE AND ON THE ATTACHED SHEETS NUMBERED Nil HAVE BEEN EXAMINED IN ACCORDANCE WITH ESTABLISHED PROCEDURES AND FOUND TO COMPLY, TO THE BEST OF MY KNOWLEDGE AND BELIEF WITH THE PERTINENT COMPLIANCE REQUIRMENTS.			
I THEREFORE <input type="checkbox"/> RECOMMEND FOR APPROVAL OF THESE DATA <input checked="" type="checkbox"/> APPROVE THESE DATA			
 E. Burgoin, DAR 290M			

FORM AE-100

DEPARTMENT OF TRANSPORT STATEMENT OF COMPLIANCE OF AIRCRAFT OR AIRCRAFT COMPONENTS WITH THE AIRWORTHINESS REQUIREMENTS		AE-100 No.: AE751-3 Initial Issue Date: 24 December, 2007 Revision: 1 Revision Date: 15 September, 2008
Aircraft Mfr: Bell Aircraft Model: 205A-1/212/412 Series Registration: ALL ELIGIBLE	Model / Type Airplane <input type="checkbox"/> Helicopter <input checked="" type="checkbox"/> Appliance <input type="checkbox"/> Component <input type="checkbox"/>	Approval No.: SH07-56 Delegation No.: 290M Delegate Name: E. Burgoin Company: AERO Design Ltd.

LIST OF APPROVED REPORTS AND DATA

Document Number	Revision	Document Title	Compliance Status
DCL751-3 75132	1 1	Document Control List and all documents referred to therein Tube Assembly	As per Compliance Program, CP751, Revision 1
DATA APPROVED BY TRANSPORT CANADA			

CERTIFICATION

UNDER THE AUTHORITY VESTED IN ME BY THE DEPARTMENT OF TRANSPORT, I HEREBY CERTIFY THAT THE DATA LISTED ABOVE AND ON THE ATTACHED SHEETS NUMBERED Nil HAVE BEEN EXAMINED IN ACCORDANCE WITH ESTABLISHED PROCEDURES AND FOUND TO COMPLY, TO THE BEST OF MY KNOWLEDGE AND BELIEF WITH THE PERTINENT COMPLIANCE REQUIREMENTS.

I THEREFORE ☐ RECOMMEND FOR APPROVAL OF THESE DATA

☒ APPROVE THESE DATA



E. Burgoin, DAR 290M

FORM AE-100

DEPARTMENT OF TRANSPORT STATEMENT OF COMPLIANCE OF AIRCRAFT OR AIRCRAFT COMPONENTS WITH THE AIRWORTHINESS REQUIREMENTS		AE-100 No.: AE800-1 Initial Issue Date: 16 September, 2008 Revision: 0 Revision Date: Approval No.: SH07-56 Delegation No.: 290M Delegate Name: E. Burgoin Company: AERO Design Ltd.
Aircraft Mfr: Bell Aircraft Model: 205A-1/212/412 Series Registration: ALL ELIGIBLE	Model / Type Airplane <input type="checkbox"/> Helicopter <input checked="" type="checkbox"/> Appliance <input type="checkbox"/> Component <input type="checkbox"/>	

LIST OF APPROVED REPORTS AND DATA

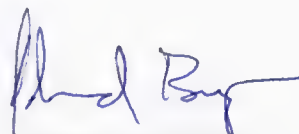
Document Number	Revision	Document Title	Compliance Status
DCL800-1	0	Document Control List and all documents referred to therein	As per Compliance Program, CP800-1, Revision 0
DCL800-11	0	Document Control List and all documents referred to therein	
ER800.01	0	Engineering Report	
80001	0	Quick Release Step Installation	
80010	0	Step Assembly	
80020	0	Step End Fabrication	
DATA APPROVED BY TRANSPORT CANADA			
ICA800.90	0	Instructions for Continued Airworthiness	
FMS751.91	1	Flight Manual Supplement	

CERTIFICATION

UNDER THE AUTHORITY VESTED IN ME BY THE DEPARTMENT OF TRANSPORT, I HEREBY CERTIFY THAT THE DATA LISTED ABOVE AND ON THE ATTACHED SHEETS NUMBERED Nil HAVE BEEN EXAMINED IN ACCORDANCE WITH ESTABLISHED PROCEDURES AND FOUND TO COMPLY, TO THE BEST OF MY KNOWLEDGE AND BELIEF WITH THE PERTINENT COMPLIANCE REQUIRMENTS.

I THEREFORE ☐ RECOMMEND FOR APPROVAL OF THESE DATA

☒ APPROVE THESE DATA


 E. Burgoin, DAR 290M

DOCUMENT CONTROL LIST

DOCUMENT NO.	DOCUMENT CONTENT	REVISION
INSTALLATION DOCUMENTS		
80001	Quick Release Step Installation	0
ICA800.90	Instructions for Continued Airworthiness	0
FMS751.91	Flight Manual Supplement	1
FABRICATION DOCUMENTS		
DCL800-11	Document Control List for Quick Release Step	0
ENGINEERING DOCUMENTS		
APPROVAL:	ORIGINAL DATE: 15 September, 2008 REVISION DATE:	AERO DESIGN LTD. 2013 – 39 th Ave NE, Calgary, Alberta, T2E 6R7 Ph. (403) 250-8027 Fax. (403) 250-8333 www.aerodesign.ca
	SHEET 1 OF 1	Bell 205A-1 / 212 / 412 Quick Release Step Installation
	DCL800-1	Rev. 0

DOCUMENT CONTROL LIST

DOCUMENT NO.	DOCUMENT CONTENT	REVISION
FABRICATION DOCUMENTS 80010 80020	Step Assembly Step End Fabrication	0 0
ENGINEERING DOCUMENTS ER800.01	Engineering Report	0
APPROVAL:	ORIGINAL DATE: 15 September, 2008 REVISION DATE:	AERO DESIGN LTD. 2013 – 39 th Ave NE, Calgary, Alberta, T2E 6R7 Ph. (403) 250-8027 Fax. (403) 250-8333 www.aerodesign.ca
	SHEET 1 OF 1	Bell 205A-1 / 212 / 412 Quick Release Step Fabrication
	DCL800-11	Rev. 0

MSI 53 – Review of Supplemental Instructions for Continued Airworthiness

APPENDIX A-3 NORMAL CATEGORY ROTORCRAFT – CAR 529

BLOCK 1

Name of the applicant for the design change approval:	Aero Design Ltd.
Description of the design change:	Installation of Quick Release Step on Bell 205A-1/212/412
Certification Basis of design change and revision date:	FAR 29, Amendment 29-2
CAR Standard A529.1(c) Program showing how changes to supplemental ICA made by the applicant or by the manufacturers of products and appliances installed in the aeroplane pursuant to the design change will be distributed:	Section 0-3 of Supplemental ICA (ICA 800.90)
CAR Standard 513.05 (1) (g) (iv): Installation Instructions:	Installation Drawing 80001

BLOCK 2

Note: Enter "N/A" when no supplemental ICA are needed.

Regulatory Standard Reference Column 1	Design Approval Holder (DAH) ICA Reference Column 2	Applicant Means of Compliance Supplemental ICA Requirements Column 3
A529.2 (a) Manual(s) (a) The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.	ICA ref: Bell 205A-1/212/412 Maintenance Manuals, BHT-205A1-MM-1 BHT-212-MM BHT-412-MM	Supplemental ICA ref: Single Manual (ICA800.90)
A529.2 (b) Practical arrangement (b) The format of the manual or manuals must provide for a practical arrangement.	ICA ref: Bell 205A-1/212/412 Maintenance Manual	Supplemental ICA ref: Arranged in ATA format
A529.3 The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:		
A529.3 (a) Rotorcraft maintenance manual or section		
A529.3 (a) (1) (Introduction) (1) Introduction information that includes an explanation of the rotorcraft's features and data to the extent necessary for maintenance or preventive maintenance.	ICA ref: Bell 205A-1/212/412 Maintenance Manual, Chapter 1	Supplemental ICA ref: Section 0-1

MSI 53 – Review of Supplemental Instructions for Continued Airworthiness

Regulatory Standard Reference Column 1	Design Approval Holder (DAH) ICA Reference Column 2	Applicant Means of Compliance Supplemental ICA Requirements Column 3
A529.3 (a) (2) (Description) (2) A description of the rotorcraft and its systems and installations including its engines, rotors, and appliances.	ICA ref: Bell 205A-1/212/412 Maintenance Manual, Chapter 1	Supplemental ICA ref: Section 0-5
A529.3 (a) (3) Control & Operation (3) Basic control and operation information describing how the rotorcraft components and systems are controlled and how they operate, including any special procedures and limitations that apply.	ICA ref: N/A	Supplemental ICA ref: N/A
A529.3 (a) (4) Servicing (4) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and levelling information.	ICA ref: Bell 205A-1/212/412 Maintenance Manual, Chapter 12	Supplemental ICA ref: N/A
A529.3 The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:		
A529.3 (b) Maintenance Instructions.		
A529.3 (b) (1) Scheduling 1) Scheduling information for each part of the rotorcraft and its engines, auxiliary power units, rotors, accessories, instruments, and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross-references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the rotorcraft.	ICA ref: Bell 205A-1/212/412 Maintenance Manual, Chapter 5	Supplemental ICA ref: Section 5-1

MSI 53 – Review of Supplemental Instructions for Continued Airworthiness

Regulatory Standard Reference Column 1	Design Approval Holder (DAH) ICA Reference Column 2	Applicant Means of Compliance Supplemental ICA Requirements Column 3
A529.3 (b) (2) Troubleshooting (2) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.	ICA ref: N/A	Supplemental ICA ref: N/A
A529.3 (b) (3) Removal/replacement (3) Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.	ICA ref: Bell 205A-1/212/412 Maintenance Manual, Chapter 25	Supplemental ICA ref: Section 25-1, 25-2
A529.3 (b) (4) General (4) Other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the center of gravity, lifting and shoring, and storage limitations.	ICA ref: Bell 205A-1/212/412 Maintenance Manual, Chapter 7 and 8	Supplemental ICA ref: N/A
A529.3 (c) Access (c) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.	ICA ref: N/A	Supplemental ICA ref: N/A
A529.3 (d) Special inspections (d) Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.	ICA ref: Bell 205A-1/212/412 Maintenance Manual, Chapter 5	Supplemental ICA ref: Section 5-1
A529.3 (e) Protective treatment (e) Information needed to apply protective treatments to the structure after inspection.	ICA ref: Bell Standard Practices Manual BHT-ALL-SPM, Chapter 3	Supplemental ICA ref: Section 5-3
A529.3 (f) Fasteners, torque values, etc (f) All data relative to structural fasteners such as identification, discard recommendations, and torque values.	ICA ref: Bell Standard Practices Manual BHT-ALL-SPM, Chapter 2	Supplemental ICA ref: Section 25-4
A529.3 (g) Special tools (g) A list of special tools needed.	ICA ref: N/A	Supplemental ICA ref: N/A

MSI 53 – Review of Supplemental Instructions for Continued Airworthiness

BLOCK 3

Note: The statement in block 5 does not constitute an approval of the Airworthiness Limitations Section. Airworthiness Limitations differ from other maintenance tasks, in that they are mandatory, as a direct condition of the approval of the type design. They are therefore referenced directly in the approval document itself. However, they must also be included in the Supplemental Instructions for Continued Airworthiness.

A529.4 AWL - Separate Section 1

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure approved under 529.571. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual. This section must contain a legible statement in a prominent location that reads: "The Airworthiness Limitations section is approved by the Minister and specifies maintenance required by any applicable airworthiness or operating rule unless an alternative program has been approved by the Minister."

ICA ref: Bell 205A-1/212/412
Maintenance Manual, Chapter 4

Supplemental ICA ref: Chapter 4

BLOCK 4 – Applicant Statement of Compliance

The Supplemental ICA referenced above comprises the complete listing of supplemental ICA necessary to show compliance with the regulatory standard that supports this change in type design.

Applicants Signature: _____

Date: 16 September, 2008

Applicants Name: E. Burgoin, P.Eng, DAR 290M

BLOCK 5 – Minister's Statement of Acceptability

The design change is adequately supported by existing ICA and/or supplemental ICA, as identified above and is acceptable to the Minister.

Reviewer's Name: _____ Phone # _____ Email: _____ Mail Routing Symbol: _____

Signature: _____ Date: _____ NAPA Number _____

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS ICA 800.90

QUICK RELEASE STEP

Preface

These Instructions for Continued Airworthiness shall be included in the rotorcraft Maintenance Manual when the Quick Release Step assembled in accordance with AERO Design Ltd. Document Control List DCL800-10, Revision 0, or later approved revision, is installed.

The information contained herein supplements the information in the basic Maintenance Manual. For Maintenance practices and procedures not contained in these Instructions for Continued Airworthiness refer to the basic Maintenance Manual and its approved supplements.

Revision 0
Date: 17 July, 2008

AERO Design Ltd.
Engineering Consultants

2013 – 39th Avenue N.E., Calgary, Alberta T2E 6R7
Phone: (403) 250-8027
Fax: (403) 250-8333
E-Mail: infor@aerodesign.ca

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RECORD OF REVISIONS

Revision Number	Issue Date	Date Inserted	By
0			Original Issue

LIST OF EFFECTIVE PAGES

List of Revisions

Revision 0 (Original Issue) 17 July, 2008

List of Effective Pages

<u>Description</u>	<u>Pages</u>	<u>Revision No.</u>
Cover	1	0
Revision Record/List of Effective Pages	2	0
Table of Contents	3	0
00-00-00	4-5	0
04-00-00	6	0
05-00-00	7-9	0
11-00-00	10	0
25-50-00	11-13	0

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CHAPTER 0 – INTRODUCTION

0-1 SCOPE

The following Instructions for Continued Airworthiness (ICA) satisfy the requirements of 14 CFR 29.1529, and provide the information necessary to complete the on-going maintenance and inspections required for rotorcraft embodying the Quick Release Step as described herein.

0-2 DEFINITIONS AND ABBREVIATIONS

ICA - Instructions for Continued Airworthiness

LH - Left Hand

RH - Right Hand

0-3 DISTRIBUTION

Copies of this ICA and amendments shall be distributed to all known purchasers of the Quick Release Step. Requests for a copy may be made in writing to:

AERO Design Ltd.
2013 39th Avenue N.E.
Calgary, Alberta
T2E 6R7
Fax: 403-250-8333
Email: info@aerodesign.ca

Any changes will be sent to Transport Canada. All changes will be recorded in the Record of Revisions page at the front of this document.

0-4 COMPATIBILITY

Prior to incorporating this modification, the installer shall establish that the inter-relationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the helicopter.

0-5 GENERAL DESCRIPTION

The Quick Release Step installation consists of a step assembly which is attached to quick release mounting provisions provided on the helicopter. These mounting provisions are capable of mounting various equipment including cargo baskets.

The step itself consists of an aluminum extrusion attached to brackets on the ends with fittings that lock into the quick release mechanism.

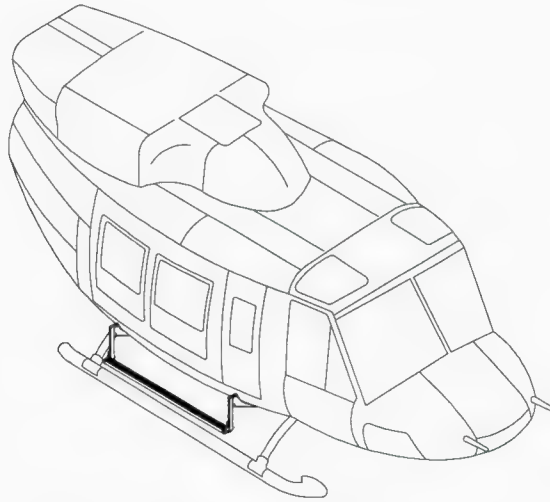


Figure 2 – Bell Medium Step Installation

CHAPTER 4 - AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations section is Transport Canada-approved and specifies maintenance required under Section 571 of the Canadian Aviation Regulations, unless an alternative program has been approved.

No additional airworthiness limitations have been imposed due the installation of the Quick Release Step.

CHAPTER 5 – INSPECTION REQUIREMENTS

5-1 INSPECTION SCHEDULE

Continued airworthiness is contingent upon compliance with the following inspection items. These items shall be completed in conjunction with the rotorcraft Maintenance Inspection schedule, or other approved program, or upon removal and replacement of any component of Quick Release Step.

Daily Inspection

1. Inspection Area: Step

- a) Inspect the step attachment to the beams for condition and security. Ensure quick release mechanism is completely extended, flush with the outboard surface of the beam.

300 Hour or Annual Inspection

Refer to the ICA for the Quick Release Cargo Basket for each specific model of helicopter for inspection of mounting provisions.

1. Inspection Area: Step

- a) Visually inspect welds attaching end brackets to step extrusion for cracks, corrosion or other damage.
- b) Visually inspect step for damage.
- c) Visually inspect lugs attaching the step to the beams for security and damage.

Special Inspections

Following a hard landing inspect the Quick Release Step installation in accordance with the 300 hour or annual inspection listed above.

5-2 DAMAGE LIMITS / REPAIR INSTRUCTIONS

Refer to the ICA for the Quick Release Cargo Basket for each specific model of helicopter for further limits and repair instructions.

If damage is found in the inspections above, repair in accordance with the instructions below.

1. Step Assembly

Part	Type of Damage	Max. Allowable	Repair
Step End Bracket	Corrosion	0.010" deep	Blend up to 0.010" deep with scotchbrite.
	Scratches / Nicks	0.010" deep x 0.5" long	Blend up to 0.010" deep with scotchbrite.
	Cracks/Dents	None	N/A
	Bent Lugs	None	N/A
Centre Step Section	Corrosion	2" x 2" x 0.010" deep	Blend up to 0.010" deep with scotchbrite.
	Scratches / Nicks	0.010" deep x 1" long	Blend up to 0.010" deep with scotchbrite.
	Cracks / Dents	None	N/A
	Permanent Deflection of Step	0.25" max at middle of step	None

2. Steel Beams

Part	Type of Damage	Max. Allowable	Repair
Steel Beam	Corrosion	0.030" deep	Blend up to 0.030" deep with scotchbrite.
	Scratches / Nicks (Outboard face)	0.030" deep x 0.125" wide	Blend up to 0.030" deep with scotchbrite.
	Scratches / Nicks (all other sides)	0.060" deep x 0.125" wide	Blend up to 0.060" deep with scotchbrite.
	Cracks/Dents	None	N/A
	Elongation of Keyway	See figure 3	None
	Widening of slots	27/64" (0.422) diameter (check with a 27/64" drill)	None



Figure 3 – Keyway dimensions

3. Step Welds

Cracks up to 0.25" long may be repaired as follows:

- a) Clean area of paint.
- b) Grind away weld in area of crack.
- c) T.I.G. weld per MIL-STD-2219 Class "C" using ER4043 filler rod. Do not grind flush.
- d) Touch up paint as noted in section 5-3.

5-3 PROTECTIVE TREATMENT INFORMATION

1. Step Assembly

The Step Assembly is supplied powder coated white. If the powder coat is damaged, touch up with white polyurethane paint. The tread area is painted with anti-skid paint. If the anti-skid paint is damaged, touch up with Randolph X1567 Wingwalk grip paint or equivalent.

CHAPTER 25 – EQUIPMENT AND FURNISHINGS

The Quick Release Step Installation may be applied to the right and/or left side of the helicopter. Refer to the ICA for the Quick Release Cargo Basket for each specific model of helicopter for installation and removal instructions for the mounting provisions.

25-1 STEP INSTALLATION

Refer to Figure 4.

1. Set upper attachment into upper keyway in forward and aft beams.
2. Lift step until lower attachment fitting hits stop. Push fitting into keyway and slide step down until locked.

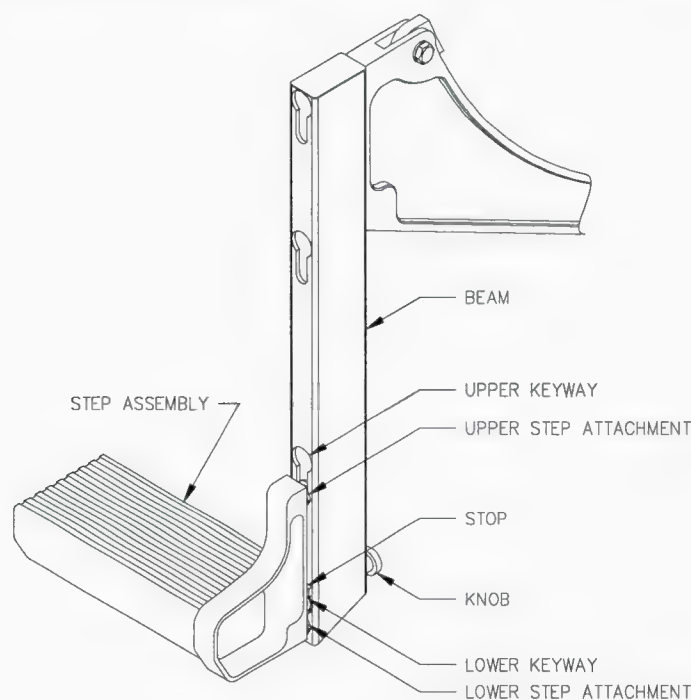


Figure 4 – Step Attachment

25-2 STEP REMOVAL

Refer to Figure 4.

1. Pull knob at bottom end of forward beam and lift step until lower attachment fitting is free of keyway. Keep upper attachment in keyway on beam.
2. Pull knob at bottom end of aft beam and lift step until lower attachment fitting is free of keyway. Keep upper attachment in keyway on beam.
3. Lift step until upper attachments are out of keyways on both beams and remove from helicopter.

25-3 WEIGHT AND BALANCE

Two weight and balance configurations are required for the pilot. The first is the installation of Provisions only. The second is Step and Provisions as the step may be removed/installed in the field by the pilot.

Bell 205A-1 / 212 / 412 Series

Configuration 1 – Provisions Only		Weight (lbs)	Longitudinal		Lateral	
Part #	Name		Arm (in)	Moment (in-lbs)	Arm (in)	Moment (in-lbs)
75115-01	Forward Beam Assembly	5.0	84.5	422.5	46.0	230.0
75116-01	Aft Beam Assembly	4.6	155.1	713.5	47.3	217.6
75102-01	Provisions Installation (Total)	9.6	118.3	1136.0	46.6	447.6

Configuration 2 – Step and Provisions		Weight (lbs)	Longitudinal		Lateral	
Part #	Name		Arm (in)	Moment (in-lbs)	Arm (in)	Moment (in-lbs)
75115-01	Forward Beam Assembly	5.0	84.5	422.5	46.0	230.0
75116-01	Aft Beam Assembly	4.6	155.1	713.5	47.3	217.6
80010-7100	Step	7.8	119.8	934.4	52.2	407.1
80001-01	Step Installation (Total)	17.4	119.0	2070.4	49.1	854.7

Note: Lateral arms are given for right side installation. For installation on left side, lateral arms are negative.

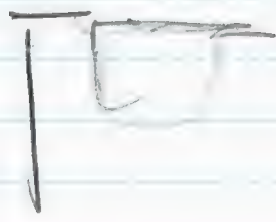
25-4 STRUCTURAL FASTENER DATA

Refer to Standard Practices Manual for torque values not listed in this ICA.

17" back

21" front

84
20
50
89
00
52.5
006



TEST



500 1500
5.25
347
15.75

600 lb 16 3/8"

1000 lb 16"

1500 lb 15 5/8"

1800 lb 15 1/4"

170
5.25
850
347

850
892.50

LOAD OFF 17 1/8"

900
X2
1800

AERO DESIGN LTD.

2013 – 39 Avenue N.E., Calgary, Alberta, T2E 6R7

Tel: 403-250-8027

Fax: 403-250-8333

www.aerodesign.ca

21 July, 2008

Transport Canada
Aircraft Certification Division
800-1601 Airport Road
Calgary, Alberta
T2E 6Z8

FAXED
21 JULY 08
11:30 AM

Attn: Greg Oucharek

Your File : C-08-0118

Our File : 751/800

Re: Bell 205A-1/212/412 Quick Release Cargo Basket and Step

Greg,

Please find attached the following documents related to this project:

Modification Approval Request Application Form
Compliance Program

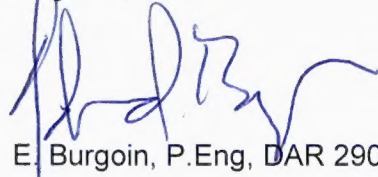
MOD800-1
CP800-1

Rev. 0
Rev. 0

Please extend my delegation to include the paragraphs noted on the attached compliance program.

Please note that a revision has already been initiated and billed.

Regards,



E. Burgoin, P.Eng, DAR 290M

Encl.

AIRWORTHINESS REQUIREMENTS COMPLIANCE PROGRAM

APPLICANT: AERO Design Ltd.
2013 39th Avenue NE
Calgary, Alberta, T2E 6R7

DATE: 16 July, 2008
REV. No. 0

CORRESPONDANCE TO:
(If other than applicant)

MAKE: Bell
MODEL: 205A-1, 212, 412 Series

REGISTRATION: All Applicable
SERIAL No.: All Applicable

NATURE OF WORK: Installation of Quick Release Step onto existing Quick Release Mounting Provisions

MODEL CERTIFICATION BASIS: FAR 29, Amendment 29-2, plus select sections of later amendments (Bell 412 CF basis of certification)
MODIFICATION CERTIFICATION BASIS: FAR 29, Amendment 29-2, plus select sections of later amendments (Bell 412 CF basis of certification)

Airworthiness Requirement	Subject for Compliance or Documentary Proof	Form of Substantiation	DOT	DAR	Comments
Paragraph	Amdt.				
Subpart B – Flight					
29.29	2	Empty Weight and Corresponding C of G		X	
29.251	2	Vibration		**	As discussed with Greg Oucharek, July 18/08
Subpart C – Strength Requirements					
29.301	2	Loads – Air Drag/Lift Loads		X	
29.301	2	Loads – Inertia Loads		X	
29.303	2	Factor of Safety		X	
29.305	2	Strength and Deformation		X	
29.307	2	Proof of Structure		X	
29.337(a)	2	Limit Maneuvering Load Factor – Positive		X	Critical load factor in downward direction.
29.561	2	Emergency Landing Conditions		X	Step is located below cabin, not above or behind occupants.
Subpart D – Design and Construction					
29.601	2	Design		X	Design is conventional.
29.603	2	Materials		X	Materials used are specified in Mil-Hdbk-5J.
29.605	2	Fabrication Methods		X	Design is conventional.
29.609	2	Protection of Structure		X	
29.611	2	Inspection Provisions		X	Design is easy to inspect.

Airworthiness Requirement	Subject for Compliance or Documentary Proof		Form of Substantiation	DOT	DAR	Comments
Paragraph	Amdt.					
29.613	2	Material Strength Properties and Design Values	Values used as per Mil-Hdbk-5J		X	
29.625	2	Fitting Factor	Analysis		X	
29.629	2	Flutter	Statement in Report		**	As discussed with Greg Oucharek, July 18/08
29.783	2	Doors	N/A			Installation does not block doors.
29.807	2	Emergency Exits	N/A		X	Installation does not block doors.
29.1387	9	Position Light System Dihedral Angles	N/A			No change from Type Approval.
29.1401	11	Anticollision Light System	N/A			No change from Type Approval.
Subpart G – Operating Limitations and Information						
29.1505	3	Never Exceed Speed	N/A			No change from Type Approval.
29.1529	2	Maintenance Manual	ICA Provided		X	
29.1581	15	Rotorcraft Flight Manual – General	Flight Manual Supplement		X	Existing FMS for basket updated.

Items marked ** indicate chapters where extension of delegation is requested.

MODIFICATION APPROVAL REQUEST APPLICATION FORM

MOD800-1, Rev. 0

1. NAME AND ADDRESS OF APPLICANT:		2. IDENTIFICATION OF PRODUCT	
AERO Design Ltd. 2013 - 39th Avenue NE Calgary, Alberta T2E 6R7		MAKE: Bell	MODEL: 205A-1, 205B, 212, 412, 412CF, 412EP
ALL CORRESPONDANCE TO: AERO Design Ltd. 2013 - 39th Avenue NE Calgary, Alberta T2E 6R7		SERIAL No.: All Eligible	REGISTRATION: All Eligible

3. REQUEST FOR:

A. SUPPLEMENTAL TYPE CERTIFICATE (STC)	<input type="checkbox"/>	
B. STC/STA REVISION	<input checked="" type="checkbox"/>	STC/STA No. SH07-56
C. LIMITED SUPPLEMENTAL TYPE CERTIFICATE (LSTC)	<input type="checkbox"/>	
D. LIMITED STC/STA REVISION	<input type="checkbox"/>	LSTC/LSTA No.
E. F.A.A. SUPPLEMENTAL TYPE CERTIFICATE	<input type="checkbox"/>	
F. F.A.A. STC REVISION	<input type="checkbox"/>	STC No.
G. FAMILIARIZATION OF F.A.A. STC	<input type="checkbox"/>	STC No.
H. REPAIR DESIGN APPROVAL (RDC)	<input type="checkbox"/>	
I. PARTS DESIGN APPROVAL (PDA)	<input type="checkbox"/>	

4. TITLE OF MODIFICATION OR REPAIR:

Quick Release Mounting Provisions Installation; Quick Release Basket Installation; Quick Release Step Installation

5. BRIEF DESCRIPTION OF MODIFICATION OR REPAIR:

Installation of external quick release mounting provisions, and installation of a cargo basket on those provisions. This revision adds a step that may be installed on the quick release provisions when the basket is removed.

6. APPLICABLE TYPE APPROVAL (TA) OR TYPE CERTIFICATE (TC) DOCUMENTS:

A. TA NO. H-86 B. TC No. H1SW C. OTHER

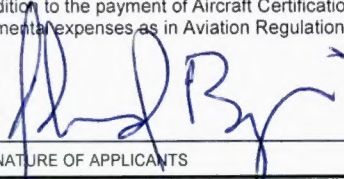
7. PROPOSED BASIS OF APPROVAL:

A. SAME AS TA ☒ B. SAME AS TC ☐ C. OTHER ☐ (Please specify)

8. DOCUMENTATION CHECKLIST	REQUIRED		FOR DOT USE ONLY		
			RECEIVED		
	YES	NO	YES	NO	DATE
COMPLIANCE PROGRAM	X				
MASTER DRAWING LIST	X				
FLIGHT MANUAL SUPPLEMENT	X				
MAINTENANCE MANUAL SUPPLEMENT		X			
INSTRUCTIONS FOR CONTINUING AIRWORTHINESS	X				
ENGINEERING REPORTS	X				
DESIGN DRAWINGS		X			
MANUFACTURE DRAWINGS & INSTALLATION INSTRUCTIONS	X				
ELECTRICAL LOAD ANALYSIS		X			
DRAFT STC, LSTC OR RDA		X			
WEIGHT AND MOMENT CHANGE	X				
FLIGHT TEST DATA		X			
OTHER (Specify)					

9. APPLICANT'S REMARKS:

10. In addition to the payment of Aircraft Certification approval fees as prescribed in Canadian Aviation Regulations (CAR) Section 104, I agree to reimburse Transport Canada incremental expenses as in Aviation Regulation Directive No. 3, or equivalent, as applicable. For further details governing cost recovery, refer to AMA 513/4.

PER: 	Consultant	21 July, 2008
SIGNATURE OF APPLICANTS	TITLE	DATE

11.

SIGNATURE OF REGIONAL ENGINEER	DATE
--------------------------------	------